

ZEISS

West Germany

Carl Zeiss

D-7082 Oberkochen

Operation microscope
OPMI 6 SFR XY
OPMI 6 SFR

Operating Instructions

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Notes:

- The 6- to 10-digit numbers are unit or component order numbers (e.g. 302926)
- **WARNING**
These units are not designed to be used in areas where there is a risk of explosion.
- Alterations or repairs to electrical medical equipment must only be carried out by the manufacturer or agents expressly authorized to do so.
- We reserve the right to make technical alterations.

General notes

These instructions refer to the OPMI 6 SFR XY operation microscope.

No separate instructions are required for the OPMI 6 SFR model, since it is identical to the OPMI 6 SFR XY, but without the X-Y coupling.

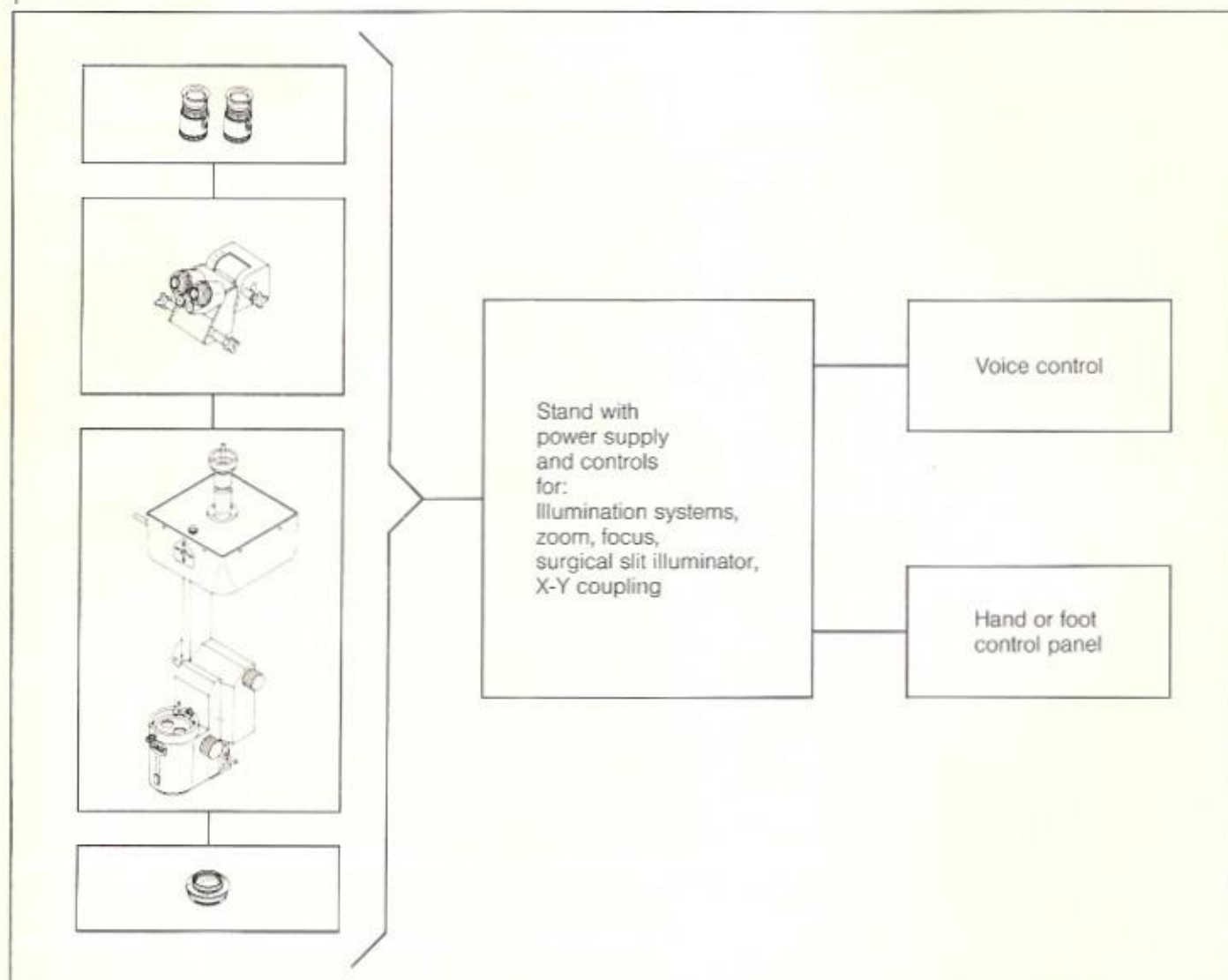
The operation microscope equipment is offered in a modular range which can be tailored to meet individual requirements.

The modules shown in Fig. 1 are the basic operational requirements.

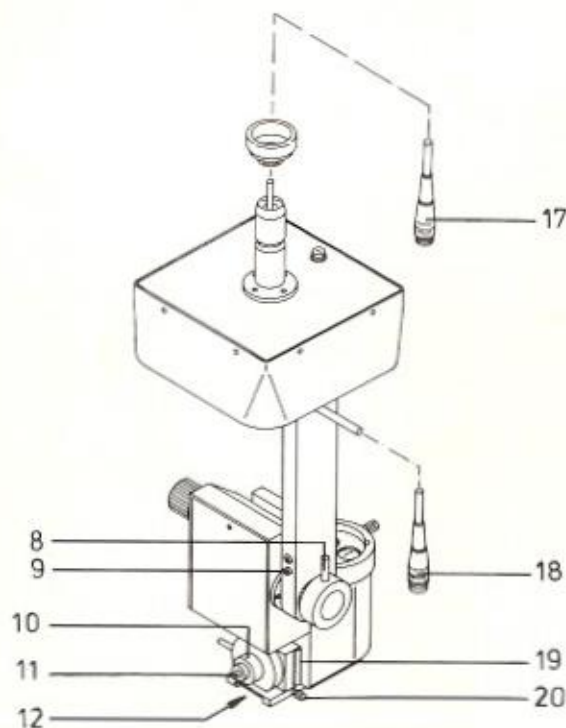
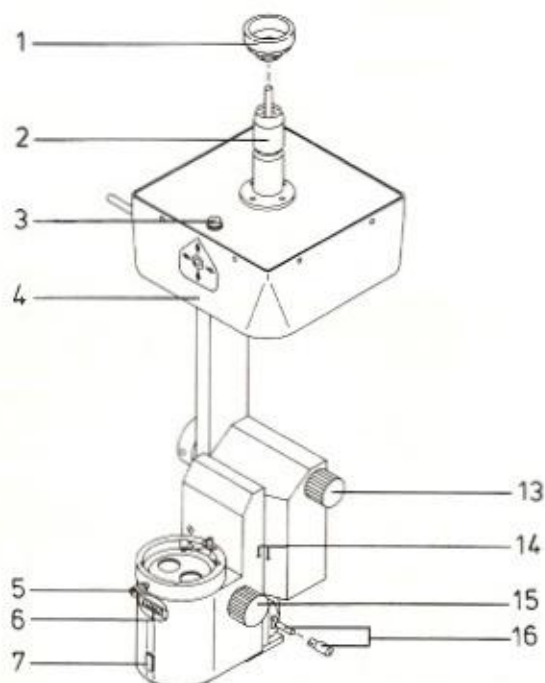
The operating microscope can be set up on a number of different stands/mounts, for which separate operating instructions are available.

In spite of the variety of stands available, fitting, adapting and using the operation microscope is virtually identical in all cases. The instructions here refer to the Universal 3B stand.

1



2



Controls

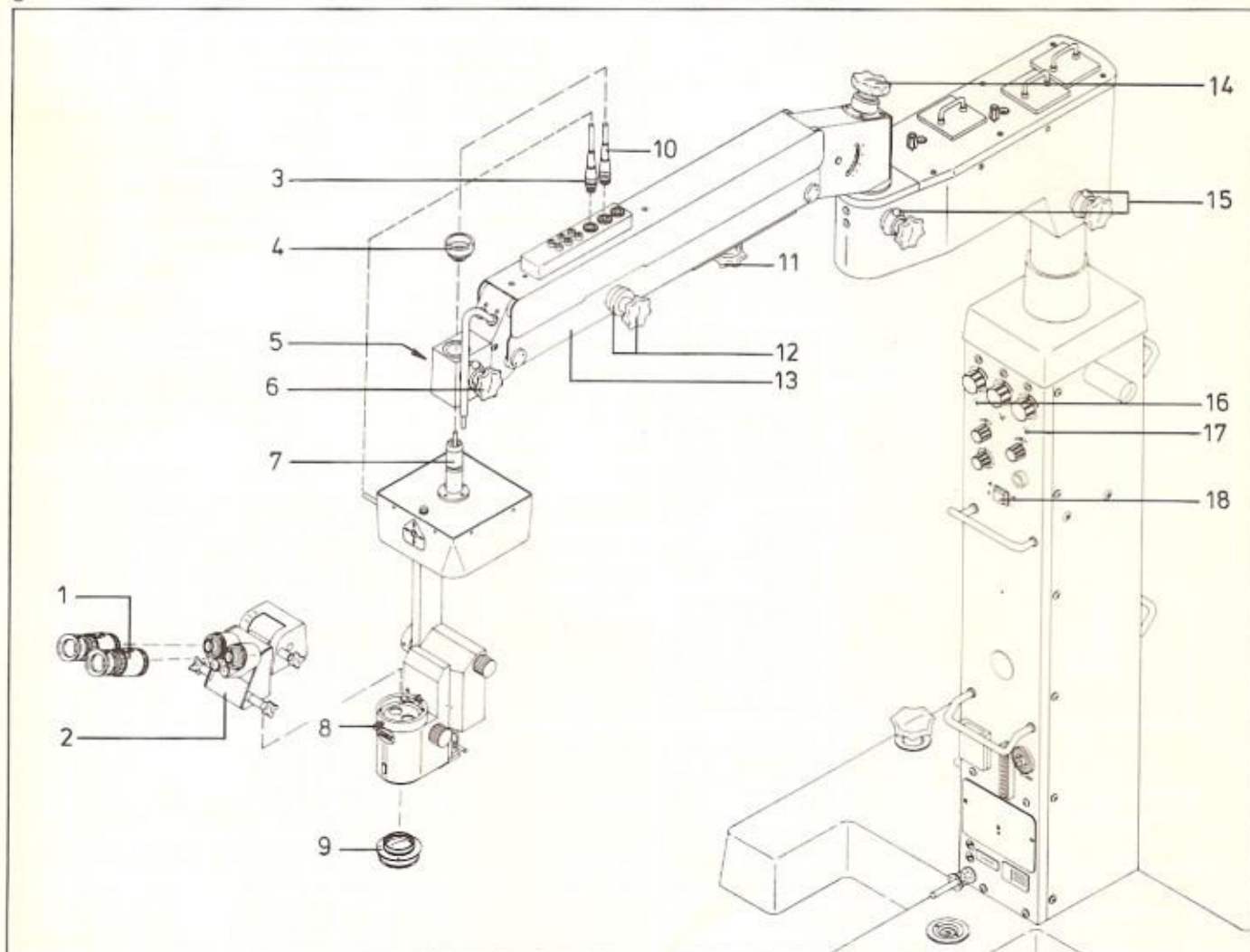
- 1** Locking screw. Holds the microscope in the stand socket and prevents it from falling out.
- 2** Microscope pivot. When inserted in the stand socket, the stand holder pin must engage in the groove of the pivot.
- 3** Pushbutton: when pressed, the coupling automatically moves to the X-Y central position (set before each operation).
- 4** This X-Y coupling enables the operation microscope to be moved electrically along the X or Y axes by ± 25 mm.
- 5** Clamping screw to hold binocular tube.
- 6** Viewing window showing magnification currently in use.
- 7** Cover: when this is removed, adapters for a T-grip or two OPML handles can be fitted.
- 8** Clamping pin. The microscope can be adjusted around the horizontal axis to change the direction of view. This pin, which is fitted in the optimum position on the clamping wheel, is used to set motion resistance, or clamp or release the microscope body. The clamping pin can be removed to prevent accidental movement.
- 9** Safety earth screw (additional earth).
- 10** Clamping screw to hold sleeve (11).
- 11** Sleeve for fiber optic cable.
- 12** Dovetail mount for surgical slit illuminator.
- 13** Knob for fine adjustment of the microscope tilt.
- 14** Marker pin/dot (indicates centre of focusing range).
- 15** Manual zoom magnification knob.
- 16** Light shield lever with sterilizable metal sleeve. Swinging in the shield prevents light hitting the retina directly via the pupil.
- 17** Power plug for X-Y coupling.
- 18** Plug for motorized focusing and zoom action.
- 19** Cover: when removed, a variety of filters can be inserted.
- 20** Clamping screw for surgical slit illuminator.

Assembly

- Undo safety slider (11), move suspension arm (13) to a comfortable position and prevent it from moving up or down by tightening the star knob (12). This star knob stays tightened until the microscope is set for the operating field.
- Insert microscope pivot (7) into socket until you hear holder pin (5) engage the groove of the pivot.
Grease microscope pivot before inserting!
- Tighten locking screw (4) to give additional protection against OPMI falling out.

- If necessary, reset motion resistance of the pivot with the round knob on star knob (6) and clamp microscope pivot with star knob (6).
- Insert plug (3) into "OPMI" outlet for power supply of the operation microscope.
- Insert plug (10) into "XY" outlet for power supply of the X-Y coupling.
- Screw objective (9) into microscope body.
- Fit inclinable binocular tube (2) to microscope body, clamp tight with screw (8) and screw on eyepieces (1).
- Connect hand control panel to stand (a foot control panel or operating chair can be used instead).

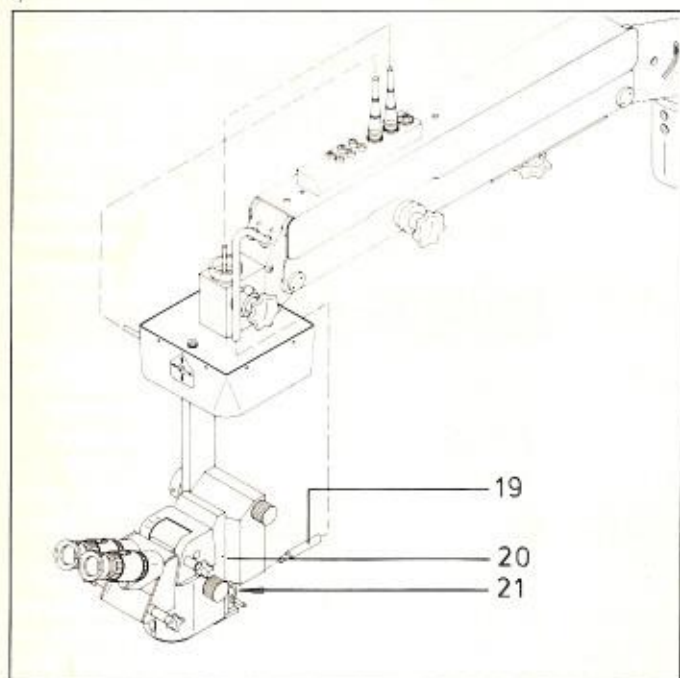
3



Adjusting the microscope to the surgical field

● Loosen star knob (12) and bring suspension arm into equilibrium with counterbalancing knob (14). The adjustment in the highest and lowest positions has to be performed with particular care. If the microscope equipment weighs more than 14 kg the highest and lowest positions cannot be fully counterbalanced. This can be remedied by turning the ring on star knob (12) (the ring is secured with a screw). However, this results in a slightly stiffer up/down motion of the arm.

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● Set working distance with safety slider (11). **It is then impossible for the arm to drop lower than the point set.**

● If necessary, adjust ease of motion of the suspension arm and the carrier arm with the round knobs (15) on the star knobs.

● Connect stand to mains with power cable. Set on/off switch (18) on stand to "I" and push selector (16) or (17) to "F" or "F" for fiber optic illumination.

● Push fiber optic cable as far as it will go into sleeve (21) and secure cable with the grub screw of the sleeve.

● Adjust brightness of microscope illumination with the knob marked red or blue on the stand.

● Set diopter scale on eyepieces and adjust the interpupillary distance on the binocular tube. If you have to wear spectacles, fold rubber cups down and set diopter scale to "0".

● Set microscope with the hand panel (or foot panel or operating chair) to middle position (20) of the focusing range.

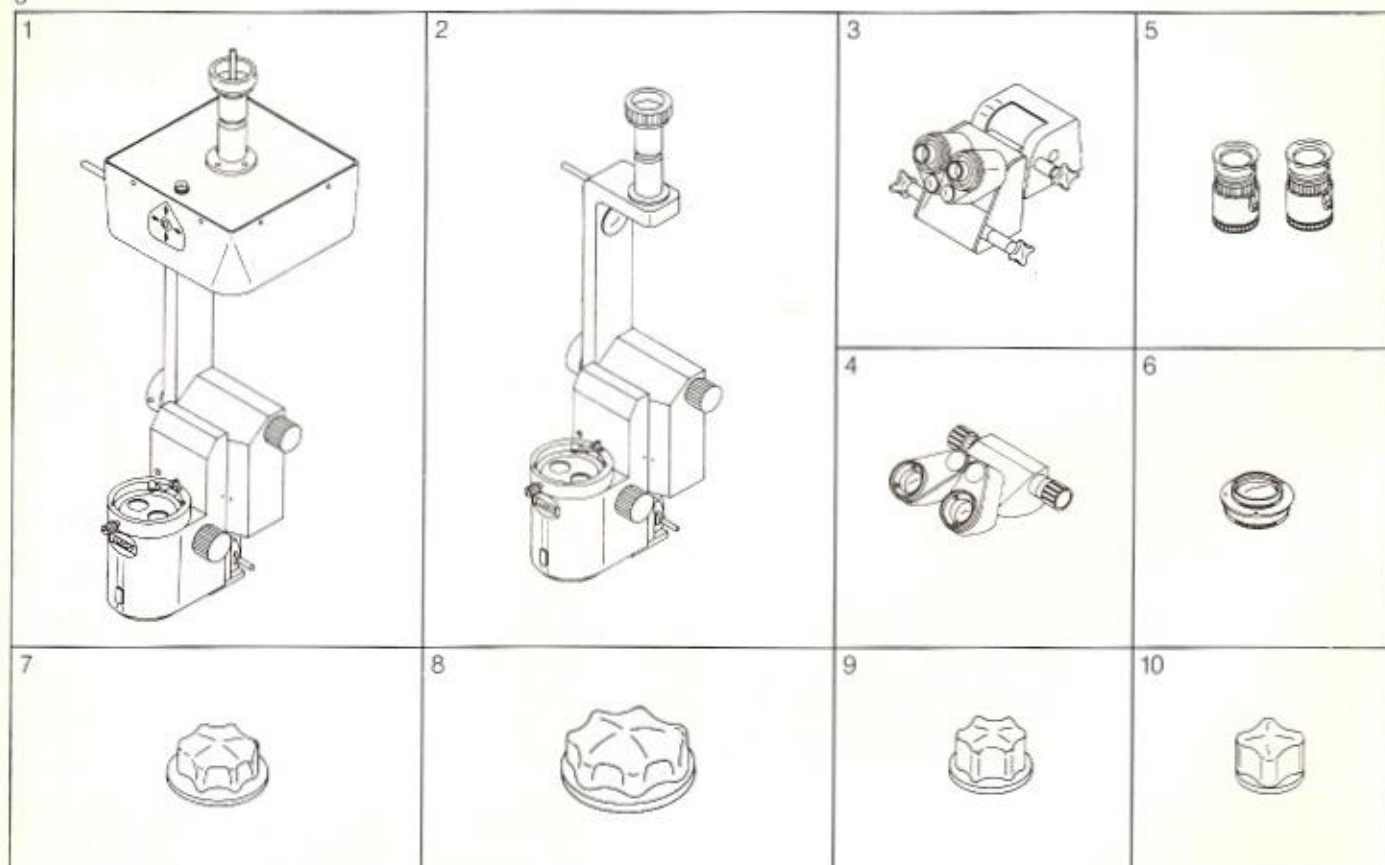
● Set microscope to working position at low zoom setting and focus object manually.

● Set maximum zoom and focus object with motorized drive. The desired magnification can now be selected without going out of focus.

List of components

	Order No.	Asepsis set 3 consisting of:	Order No.
1 OPMI 6 SFR XY operation microscope or	302926-0000	7 Small sterilizable rubber cap for OPMI	4× 305807-0000
2 OPMI 6 SFR operation microscope	302925-0000	plus 3-step magnification changer	
3 Inclinal binocular tube 0–60°, f = 170 mm or	303773-0000	8 Sterilizable rubber cap for OPMI, stand and coupling	4× 305803-0000
4 Inclinal binocular tube, f = 170 mm	303784-0000	9 Sterilizable caps for tubes, f = 170 mm (PD setting): set of 6	305810-0000
5 Wide-field, screw-type eyepieces 10×22 B or	305520-0000		
Wide-field, screw-type eyepieces 12.5×18 B	305529-0000		
6 Carrier ring with objective f = 175 mm or	303552-0000	Asepsis set 4 consisting of:	
Carrier ring with objective f = 200 mm	303553-0000	7 Small sterilizable rubber cap for OPMI	4× 305807-0000
Objective f = 225 mm	305704-0000	plus 3-step magnification changer	
Dust cover (not shown)	309290-0000	8 Sterilizable rubber cap for OPMI, stand and coupling	4× 305803-0000
		10 Rubber cap for small star knob	6× 303418-0000

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Magnifications / fields of view

Objective focal length f (mm)	Tube $f_t = 170$ mm 8× eyepieces Magnification / field of view dia. mm	Tube $f_t = 170$ mm 10× eyepieces Magnification / field of view dia. mm	Tube $f_t = 170$ mm 12.5× eyepieces Magnification / field of view dia. mm
f = 175 mm	3.9 – 15.5 / 45.3 – 11.3	4.9 – 19.4 / 45.3 – 11.3	6.1 – 24.3 / 36.2 – 9.1
f = 200 mm	3.4 – 13.6 / 51.8 – 12.9	4.3 – 17.0 / 51.8 – 12.9	5.3 – 21.3 / 41.4 – 10.4
f = 225 mm	3.0 – 12.1 / 58.2 – 14.6	3.8 – 15.1 / 58.2 – 14.6	4.7 – 18.9 / 46.6 – 11.6

Looking after the microscope

Dirt on the optical system to any great extent will reduce contrast drastically due to light scatter. For this reason, when not in use, the microscope should never be stored separately from the objective, binocular tube or eyepieces. After use and cleaning, the microscope should be covered to protect it from dust.

Objective, eyepieces and accessories not in use should be kept in dust-free containers.

Normally, only the outside of objectives or eyepieces should be cleaned. Dust on objectives should be blown off with a rubber bulb brush or removed with a grease-free brush. We recommend that brushes be cleaned in ether. Fingerprints, eyelashes etc. may be removed with a cotton wool bud on a wooden stick; the cotton wool bud may be moistened with acetone, if necessary.

Painted surfaces should be cleaned with a cotton bud moistened with petrol (Careful: risk of fire!). Any residue should be removed using a 50-50 spirit-distilled water mixture to which a squirt of a surface-active washing-up liquid has been added.

SpecificationsMagnification system

1:4 ratio zoom system

Motorized (e.g. via foot panel) or manual

For field of view, see table

Focusing

Motorized 3 mm/sec

Focusing range 50 mm

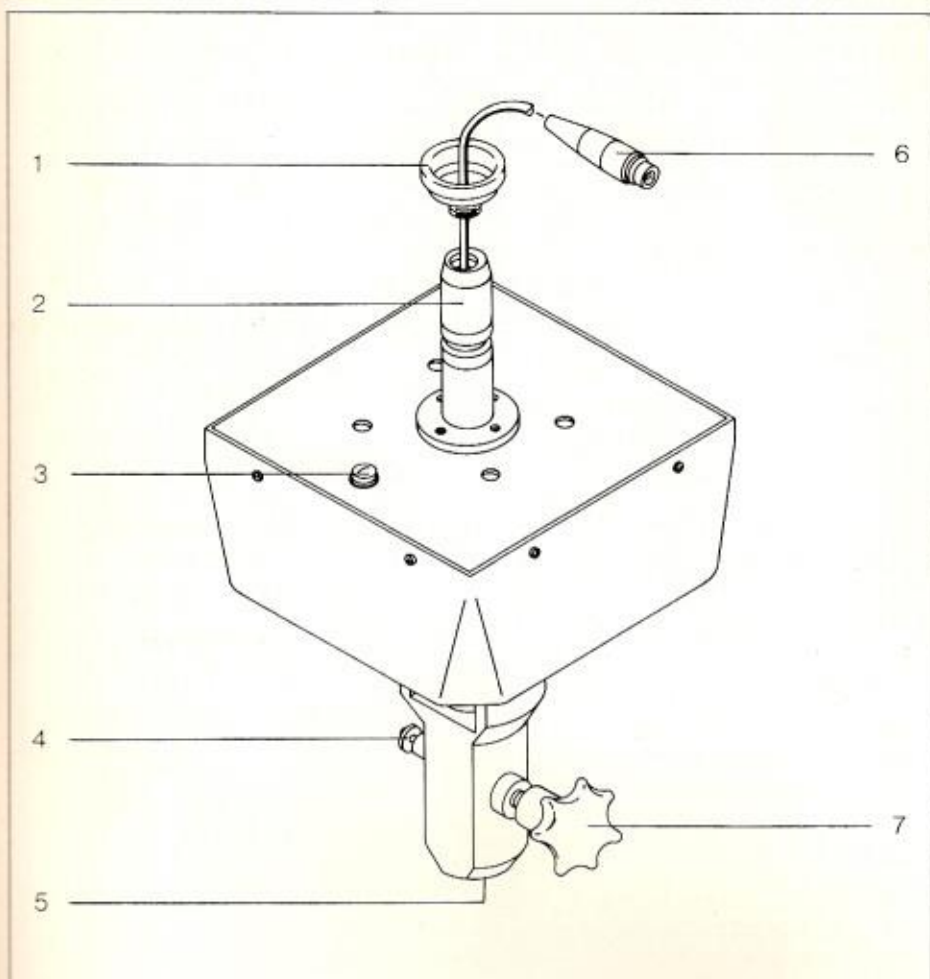
Swing range

Vertical 360°

Horizontal 330°

Weight

5.000 kg



x-y coupling

General

This coupling is required in order to be able to make slight movements in the x and y directions during operations. Center adjustment is automatic at the press of a button (3). A hand or foot switch is required to control the coupling.

Description of appliance

- 1 Locking screw. The coupling is fastened in the arm of the stand by means of this screw.
- 2 Pin for fastening in the arm of the stand.
- 3 Push-button. When this button is pressed the coupling automatically moves to the x-y center position. This position must be set before an operation.
- 4 Bolt. This bolt must engage in the groove of the appliance which is placed in the instrument holder.
- 5 Instrument holder
- 6 Plug. This 7-pole plug is connected to the appropriate outlet in the stand arm or in the power supply unit.
- 7 Star knob screw for clamping instrument in the instrument holder (5)

Specifications

Order No.	30 53 43
Length/Width/Height	160x160x310 mm
Weight	2.7 kg
Adjusting speed	3 mm/s
Adjusting range $\pm$	25 mm
Automatic adjustment to center position	
Maximum vertical load	10 kg

Points to note

- This equipment should not be used in hazardous locations.
- Alterations and repairs to electrical medical instruments may only be carried out by the manufacturer or by agents expressly authorized by him.
- Right to technical alterations reserved.

Universal S stands – Comfort, convenience, safety

The mobile Universal S floor stands offer maximum operating comfort and convenience, while meeting the most stringent safety requirements.

A carrier arm, and a suspension arm whose spring tension can be adjusted to balance the weight of the entire microscope equipment permit exact and effortless positioning of the operation microscope. All cables run inside the arms: outlets for the operation microscope, the surgical slit illuminator, the x-y coupling, the focusing coupling and other instruments (e.g. electrocautery, motorized trephine) are on top of the suspension arm. Two fiberoptic systems can be integrated in the arms.

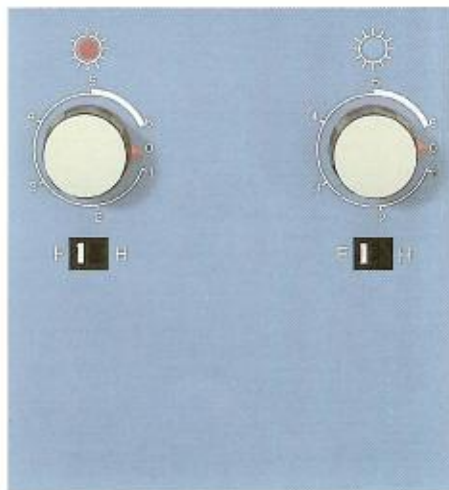
The stand is mounted on a heavy five-wing base which ensures absolute stability on slopes of up to 10°, even under maximum load and arm extension. Three spindles permit securing and levelling of the base (a level is integrated in the base). This results in excellent vibration-damping properties: drifting time of the microscope is considerably shorter than with conventional systems. All electrical components are accommodated on an easy-to-service slide-in unit which is protected against spray water. Two handles permit easy removal or replacement of this electrical assembly.

The controls are arranged at the upper end of the column. The knobs and their corresponding outlets on the suspension arm are marked with the same color. The column can be mounted on the base in two different positions so that the controls either face the surgeon or the OR staff. A control panel or an operating chair can be connected for controlling all functions of the microscope and the accessories. Each column is fitted with handles for effortless maneuvering of the stand; brackets are provided to hang up the cables. For added convenience, shelves can be attached to the column for non-Zeiss instruments.

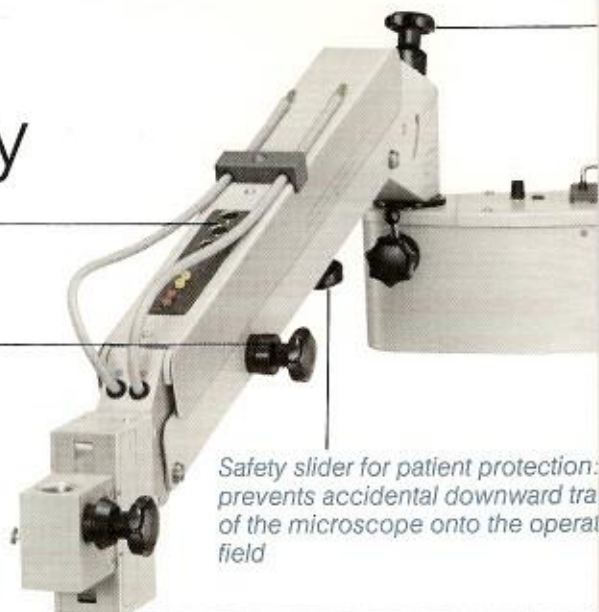
Outlets for all functions of microscope and accessories

Knob for securing the suspension arm at any height

Slider limiting the downward travel of the arm and knob for securing the arm



Controls (top: S 3, bottom: S 2)



Safety slider for patient protection: prevents accidental downward travel of the microscope onto the operation field

Motorized focusing coupling for operation microscope without integrated motorized focusing (option)

Focusing and zoom knobs with middle click stop

Brackets for hanging up cables and foot control panel

Easily accessible primary and secondary fuses, mains outlet



Stable, vibration-damping base with three threaded spindles for levelling

Adjustable spring tension of the suspension arm; counterbalancing of microscope weights from 3 to 18 kg

Integrated fiberoptic illumination units for 1 or 2 bundles with spare slide-in

Knobs for setting the ease of motion and locking the joints

Round column extended by 160 mm for increasing the working distance, for example, in neurosurgery (option)

Brightness control knobs with overload range, click stop for rated voltage; illumination type selectors

Built-in electrosurgical unit for bipolar coagulation (option)

Easy-to-service electrical assembly

Connector for hand or foot control panel or operating chair

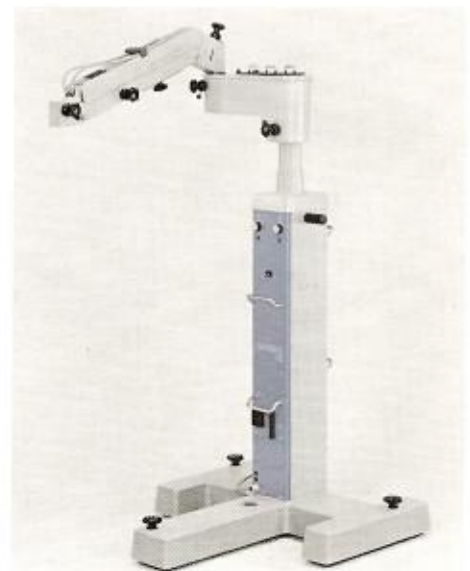
Universal S 3

The Universal S stand is available in two basic versions:

Universal S 3. Contains the power supply and controls for any Zeiss OPMI operation microscope with motorized focusing and zoom action, and with fiberoptic, halogen or tungsten bulb illumination. Two further illumination systems or non-Zeiss instruments can be connected. In addition, accessories such as the x-y coupling, the surgical slit illuminator and the focusing coupling can be used.

If requested, the Universal S 3B stand can be supplied with a built-in electrosurgical unit for bipolar coagulation. The unit is released with a pedal switch.

Universal S 2. For use with a Zeiss OPMI operation microscope without integrated motorized focusing and zoom action. Serves as the power supply for a microscope with fiberoptic, halogen or tungsten bulb illumination, and one additional fiberoptic illumination or non-Zeiss instrument (e.g. electrocautery). A motorized focusing coupling can be connected. A Universal S 2B stand with built-in electrosurgical unit for bipolar coagulation is also available.



Universal S 2

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Safety features

- Mechanical and electrical safety according to VDE 750, IEC 601-1, UL 544, SEV
- Suspension arm with maintenance-free and wear-resistant double-spring system
- Safety slider prevents accidental downward travel of the operation microscope
- Knob for securing suspension arm at any height
- Automatic thermal cutout switch for the fiberoptics supply
- Current limiter for focusing and zoom action, x-y coupling, surgical slit illuminator and focusing coupling to protect the motors against overload and maloperation
- Starting current limiter for longer bulb life
- Lamp voltage stabilization
- Spare slide-in for rapid lamp change if the fiberoptic illumination fails
- Easily accessible fuses

Specifications

Stand height	extended	1685 mm 1845 mm
Base	width depth	820 mm 900 mm
Carrier arm	length swing angle	400 mm 210°
Suspension arm	length swing angle travel counterbalancing	825 mm 285° 722 mm 3-18 kg
Total weight	Universal S 2: 140 kg	Universal S 3: 152 kg
Electrical safety	acc. to IEC 601-1; VDE 750; SEV; UL 544	
Power requirements	100-110-120-127-220-240 V, 50-60 Hz, or 120 V, 50-60 Hz	
Power consumption (without/with any instrument connected to integrated outlet)	Universal S 2: 350 VA/1350 VA UL version (USA) S 2: 350 VA/1550 VA	Universal S 3: 500 VA/1500 VA UL version (USA) S 3: 500 VA/1700 VA
	Universal S 2 B: 450 VA/1450 VA UL version (USA) S 2 B: 450 VA/1650 VA	Universal S 3 B: 600 VA/1600 VA UL version (USA) S 3 B: 600 VA/1800 VA
Fiberoptic illumination	either 1 or 2 halogen reflector lamps 12 V 100 W on quick-change slide-ins for one FO bundle each, eye protection filter S 455 (green filter on request), 1 spare lamp slide-in	
Outlets	Universal S 2 2x6 V/12 V, 100 W, convertible, adjustable; each can be switched over to integrated fiberoptic illumination; focusing coupling or surgical slit illuminator; mains outlet; electrosurgical unit for bipolar coagulation, electronic flash (options)	
	Universal S 3 2x6 V/12 V, 100 W, convertible, adjustable; 1 x 12 V, 100 W adjustable; two outlets can be switched over to integrated fiberoptic illumination; power supply for x-y coupling, surgical slit illuminator or focusing coupling; adjustable zoom and focusing speeds; mains outlet; electrosurgical unit for bipolar coagulation, electronic flash (options)	
Bipolar coagulator	power consumption rated frequency	50 W at 75 Ohm 600-1000 kHz

Subject to change

Sterilization Methods

Gas (ETO) Sterilization*

Standard ETO is acceptable for use with Kraton® thermoplastic rubber based compounds. The ETO gas will penetrate the Kraton, plasticize it and relieve molded in stresses or imposed stresses on the part.

Aeration time is greatly dependent on the size of the master carton and its permeability. One week is the minimum requirement to bring the ETO residuals below 1 PPM, as tested by the standard liquid extraction method. If the product is heated to 125-135 F in an aeration chamber with high airflow, the time can be accelerated to as little as four days.

Gamma Sterilization*

Kraton thermoplastic rubber can be sterilized using gamma radiation without suffering a large loss in physical properties even after extended storage.

Kraton G-2705 rubber was exposed to Cobalt 60 radiation doses of 3, 6, and 12 Mrads. The table below shows the effect of the radiation on the tensile properties of the material after being aged for 21 months.

Property	Original	0 Mrads	3 Mrads	6 Mrads	12 Mrads
Hardness, Shore A	55	50	48	48	43
Tensile Strength, psi	1200	+8%	+12%	-3%	-15%
300% Modulus, psi	350	+3%	-4%	-10%	-15%
Elongation, %	700	+3%	+10%	+8%	+12%

Steam Sterilization*

GLS Corporation can suggest the following maximum autoclave cycles for selected materials**

250 F for 17 minutes

240 F for 27 minutes.

There will be some slippage or creep with any Kraton thermoplastic rubber based products at these temperatures because of the relieving of molded in stress and the relaxation of imposed stresses. To minimize these effects, parts should be molded at the suggested processing conditions, and not autoclaved while being subjected to outside mechanical stresses.

* Information pertains only to Kraton G-based compounds

** Information pertains only to Kraton G-2705 compound.

Sterilization Methods

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Gamma Sterilization*

Kraton thermoplastic rubber can be sterilized using gamma radiation without suffering a large loss in physical properties even after extended storage.

Kraton G-2705 rubber was exposed to Cobalt 60 radiation doses of 3, 6, and 12 Mrads. The table below shows the effect of the radiation on the tensile properties of the material after being aged for 21 months.

Property	Original	0 Mrads	3 Mrads	6 Mrads	12 Mrads
Hardness, Shore A	53	50	48	48	43
Tensile Strength, psi	1200	+8%	+12%	-3%	-15%
300% Modulus, psi	350	+3%	-4%	-10%	-15%
Elongation, %	700	+3%	+10%	+8%	+12%

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* Information pertains only to Kraton G-based compounds

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Disposables

Endure Number

Spare Bulbs

90-1200	Zeiss 6V 30W Bt58Z	390158
90-1201	Zeiss 6V 50W Bt86Z	390186
90-1202	Zeiss 12V 100W HLX #64626	380075 1020
90-1203	EFR Housing #900	
90-1204	Zeiss 15V 150W EFR	310198
90-1205	Zeiss 12V 100W HLX #64627	380079 9040
90-1206	Zeiss Superlux 40	
90-1207	Zeiss Superlux 175	
90-1208	Zeiss Superlux 300 with Cartridge	
90-1209	Zeiss Superlux 300 Bulb Only - No Housing or Meter	
90-1302	ELS 150 21V 150W EKE	
90-1400	ELS 250 24V 250W ELC	
90-1403	ELS 24 60V 24W Metal Halide	
90-1402	ILO 300W with Cartridge	

Sterilizable Knob Covers

91-0100	Zeiss Knob Cover, MD Zoom	302602 0203
91-0101	Zeiss Knob Cover, 0-60 PD Adjustment	303418 0000
91-0102	Zeiss Knob Cover, Small, 0-180 PD Adjustment	305810 0000
91-0103	Zeiss Knob Cover, Medium,	305807 0000
91-0104	Zeiss Knob Cover, Magnification Changer	303673 0000
91-0105	Zeiss Knob Cover, Large	305803 0000
91-0106	Zeiss Knob Cover, Extra Large	303674 0000
91-0110	Zeiss Handle Cover, CS/MD Short	302501 9060
91-0111	Zeiss Handle Cover, CS/MD Long	302627 9001
91-0112	Zeiss Handle Cover, F-Cover	305808 0000
91-0113	Zeiss Handle Cover, Pro Magis	
91-0114	Zeiss Hande Cover for MDU Post	305809 0000

Dust Covers

92-0010	Dust Cover, Large
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Foot Control Covers

92-0200	Endure Poncho Disposable Foot Control Cover, 20 per Case
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Drapes

93-8222	Sterile Drape, 50/180cm, 20/70", Zeiss 48mm, Zeiss OPMI 1/OPMI 6 w/o Side Observer, 20 per Case
93-8214	Sterile Drape, 115/180cm, 45/70", Zeiss 48mm, Zeiss OPMI 1/OPMI 6 w/Side Observer, 20 per Case
93-8296	Sterile Drape, 115/300cm, 45/118", Zeiss 65mm, MD/CS/11/111/ORL/Pro Magis/Neuro/ VISU 150/VISU 200, 20 per Case